WORK PLAN
FOR
REMEDIAL INVESTIGATION
&
ALTERNATIVES ANALYSIS REPORT

330 MAPLE ROAD
AMHERST, NEW YORK

June 2006, Revised September 2006 0105-002-100

Prepared for:

BENDERSON DEVELOPMENT COMPANY, LLC.

RI/AAR WORK PLAN
330 Maple Road
Amherst, New York

Table of Contents

1.0 INTRODUCTION 1
1.1 Background 1
1.2 Project Objectives 2

2.0 SITE DESCRIPTION 3
2.1 General 3
2.2 Site Topography and Drainage 3
2.3 Geology and Hydrogeology 3
2.4 Climate 4
2.5 Population and Land Use 4
2.6 Utilities and Groundwater Use 5
2.7 Wetlands and Floodplains 5
2.8 Previous Investigations 5
2.8.1 March 2005 – Phase I Environmental Site Assessment 5
2.8.2 April 2005 – Limited Phase II Site Investigation 6
2.8.3 May 2006 – Supplemental Phase II Site Investigation Findings 6
2.9 Primary Constituents of Potential Concern (COPCs) 6

3.0 SCOPE OF WORK 7
3.1 Field Investigation Activities 7
3.1.1 Soil Investigation 7
3.1.1.1 Total Lead Sampling 8
3.1.1.2 TCLP Lead Sampling 9
3.1.1.3 PAH Sampling 9
3.1.1.4 Other Parameters Sampling 9
3.1.2 Groundwater Investigation 10
3.1.2.1 Monitoring Well Installation 10
3.1.2.2 Well Development 11
3.1.2.3 Groundwater Sample Collection 11
3.1.2.4 Groundwater Sample Analyses 13
3.1.3 Field Specific Quality Assurance/Quality Control Sampling 13
3.1.4 Bench-Scale Soil Treatability Testing 13
3.2 Investigation-Derived Waste Management 15
3.3 Site Mapping 15

4.0 QUALITY ASSURANCE/QUALITY CONTROL PROTOCOLS 16

5.0 HEALTH AND SAFETY PROTOCOLS 17

RI/AAR WORK PLAN
330 Maple Road
Amherst, New York

Table of Contents

6.0 CITIZEN PARTICIPATION ACTIVITIES 18

7.0 REPORTING AND SCHEDULE 19
7.1 RI Report 19
7.2 Alternatives Analysis Report 20
7.3 Project Schedule 21

8.0 REFERENCES 22

RI/AAR WORK PLAN
330 Maple Road
Amherst, New York

Table of Contents

LIST OF TABLES

Table 1	Summary of RI Sampling and Analytical Program

LIST OF FIGURES

Figure 1	Site Vicinity and Location Map
Figure 2	Site Plan
Figure 3	RI Plan and Sample Locations
Figure 4	Project Schedule

APPENDICES

Appendix A	Previous Investigations
Appendix B	Health & Safety Plan (HASP)

1.0 INTRODUCTION

This document presents the scope of work and implementation procedures for completion of a Remedial Investigation (RI) and Alternative Analysis Report (AAR) at 330 Maple Road, in the Town of Amherst, New York (Erie County Tax Map No. 55.03-1-10) (see Figure 1). 330 Maple Road is a 31.6 acre parcel owned by Benderson Development Company, LLC (Benderson), who intends to redevelop the property for commercial use. Based on previous environmental investigations at the site, 26 acres of the 31.6-acre parcel have been contaminated as a result of historic site use. As such, that 26-acre portion of the greater 31.6-acre parcel is defined as the Site within the context of the RI/AAR (see Figure 2).

Benderson has elected to pursue cleanup and redevelopment of 330 Maple Road under the New York State Brownfield Cleanup Program (BCP), and has applied for entrance into the BCP with the intent to execute a Brownfield Cleanup Agreement (BCA) as a non-responsible party (volunteer) per ECL§27-1405. This BCA process is initiated upon Benderson's submittal of a BCP application submitted concurrently with this RI/AAR Work Plan.

The RI/AAR will be completed by Benchmark Environmental Engineering & Science, PLLC (Benchmark) on behalf of Benderson. The work will be completed in accordance with NYSDEC DER-10 guidelines (Ref. 1).

1.1 Background

The BCP Site encompasses 26 acres on the north side of Maple Road in the Town of Amherst, New York (see Figures 1 and 2). The property is generally bounded by Maple Road to the south, residential property to the west, and a golf course to the north and east. Residential properties line the south side of Maple Road.

The Buffalo Shooting Club has occupied the property since approximately 1943. The Site presently consists of an outdoor shooting range and a two-story clubhouse. The shooting range consists of a berm along the northern property boundary, ten trap houses, and three sheds used to store targets and supplies. The clubhouse, located on the south side of the property, is a wood frame structure consisting of a kitchen and open floor plan on the first floor; offices on the second floor; and a former indoor shooting range in the basement.

An area approximately 60 feet north of the trap houses spanning the width of the "shooting lanes," contains spent clay pigeon fragments.

A Phase I Environmental Site Assessment (ESA) was performed for the subject property by Great Lakes Environmental & Safety Consultants, Inc. in March 2005 (Ref. 2). The Phase I ESA indicated that the primary concern is potential lead contamination from shooting (gun) range activities, which cover a significant portion of the property. The former indoor gun range located in the basement was also of concern. In April 2005, Great Lakes Environmental & Safety Consultants, Inc. performed a limited Phase II environmental investigation at the site (Ref. 3). Due to the nature of the shooting activities, the Phase II investigations focused on sampling for lead and semi-volatile organic compounds (SVOCs) in surface and subsurface soil, and in the basement of the clubhouse. Based on the Phase II investigation, it was determined that site soil has been impacted with lead and certain SVOCs. Groundwater was not studied during that investigation.

In May 2006, Benchmark performed a supplemental soil investigation (Ref. 4) focused on collecting site-wide near-surface (i.e., 0-6 inches below ground surface) soil samples to evaluate the areal extent of previously identified lead impact on-site. The findings of that study indicated that the majority of the near-surface soils on-site have been impacted by lead. Results of the prior site investigations are more fully described in Section 2.8. Refer to Figure 2 for a site plan showing site-wide lead sample collection locations.

1.2 Project Objectives

For sites entering the BCP at the point of investigation, NYSDEC requires completion of a RI/AAR. The primary objectives of the RI/AAR are to:

- Collect additional soil/fill and groundwater samples, under appropriate quality assurance/quality control criteria, to better delineate the nature and extent of contamination.
- Determine if the concentrations of constituents of concern in site soil and/or groundwater pose potential unacceptable risks to human health and the environment.
- Provide the data needed to evaluate potential remedial measures and determine appropriate actions to address potential significant risks.

2.0 SITE DESCRIPTION

For purposes of this work plan, the Site refers to the 26-acre parcel that is subject to the BCP as delineated in Figure 2.

2.1 General

The Site is located on the north side of Maple Road in the Town of Amherst, New York (see Figure 1). The site is currently utilized by the Buffalo Shooting Club as a shooting range and includes one building, a small arms shooting range and associated trap houses. The central area of the site is the "active" shooting range area and the eastern and western portions of the site are vacant land with vegetative cover comprised of grass, shrubs and young trees.

2.2 Site Topography and Drainage

The Site is generally flat lying with limited distinguishable site features. The surface contains soil/fill with some patches of grass and brush and one building improvement. Precipitation (i.e., rain or melting snow) either infiltrates into the soil/fill or moves to the storm drains present in the roadways via overland flow. Surface and shallow groundwater flow are likely impacted by various cycles of development and filling, as well as utility lines and foundations.

2.3 Geology and Hydrogeology

Generally, based on Soil Conservation Service data, soil on-site consists of three native soil horizons: (1) silt loam to 10-inches below grade, (2) clay loam to approximately 3.5 feet below grade, and (3) shaly-clay loam to 5-feet below grade (Ref. 5).

The Site is located in the Erie-Ontario Lake Plain Physiographic Province of Western New York. The geology of the Erie-Niagara Basin is described as consisting of unconsolidated deposits (predominantly of glacial origin) overlying Silurian- and Devonian-age sedimentary bedded or layered bedrock. The naturally occurring unconsolidated deposits in the area generally consist of the following three types: alluvial silt, sand, and gravel deposited during comparatively recent geologic time; lacustrine sediments composed primarily of silt, sand, and clay; and glacial till, a heterogeneous mixture of particles (i.e., clay,

silt, sand, gravel, and cobbles). Relief in the area is generally flat and the result of pre-glacial erosion of bedrock and subsequent topographic modification by glaciation.

The bedrock formations in the region dip to the south at approximately 30 to 40 feet per mile and exhibit only very gentle folding. In the Erie-Niagara Basin, the major areas of groundwater are within glacial sand and gravel deposits and limestone and shale bedrock. The main sources of groundwater within the bedrock are fractures and solution cavities (Ref. 6 , 7 and 8).

2.4 Climate

Western New York has a cold continental climate, with moisture from Lake Erie causing increased precipitation. Average annual precipitation is reportedly 40.5 inches and snowfall is 93.6 inches (NOAA, 2000) to the northern part of the watershed with over 150 inches per year falling on the southern portion of the watershed. Average monthly temperatures range from 24.5 degrees Fahrenheit in January to 70.8 degrees Fahrenheit in July (NOAA, 2000). The ground and lakes typically remain frozen from December to March. Winds are generally from the southwest (240 degrees) with a mean velocity of 10 miles per hour (Buffalo Airport, 1999).

2.5 Population and Land Use

The Town of Amherst, encompassing 54 square miles, has a population of approximately 116,369 (2004, U.S. Census Bureau), a decrease of 141 from the 2000 U.S. Census. The population density in the Town is approximately 2,155 people per square mile. Amherst is primarily zoned residential with commercial use mixed in along major roads, with community service and recreational use as well. The Site is located in Census Tract 91.09, in an area of the Town zoned commercial/residential, and has a population density between 5 and 2,200 persons per square mile. Land uses immediately surrounding the Site include a public golf course to the north and east, and residential single use properties to the south and west. Beyond the adjacent properties, the University of Buffalo North Campus, a private country club and golf course, light commercial properties, public use areas, and some vacant properties surround the Site

2.6 Utilities and Groundwater Use

The subject property has access to major public and private utilities, including water (Erie County Water Authority), sanitary and storm sewers (Town of Amherst), electric (Niagara Mohawk), and natural gas (National Fuel).

Groundwater on this Site has not been investigated. Currently, there are no deed restrictions on the use of groundwater at the Site; groundwater supply wells are not present on the Site. Regionally, groundwater in the area has not been developed for industrial, agriculture, or public supply purposes. Municipal potable water service is provided on-site and off-site by the Erie County Water Authority.

2.7 Wetlands and Floodplains

Erie County Internet Mapping Service shows that no State or Federal wetlands exist on the subject property; however, Federal wetlands are located approximately 0.1 miles to the north and south of the Site. Erie County Internet Mapping Service also shows a 100-year floodplain located approximately 0.1 miles to the south and east of the Site (i.e., Ellicott Creek).

2.8 Previous Investigations

A summary of the Phase I and II site investigations that have occurred at the Site are presented below. Data from these investigations is presented in Appendix A.

2.8.1 March 2005 – Phase I Environmental Site Assessment

In March 2005, Great Lakes Environmental & Safety Consultants, Inc. (GLESC) conducted a Phase I Environmental Site Assessment (ESA) of the Buffalo Shooting Club property located at 330 Maple Road, Amherst, New York on behalf of Benderson. GLESC identified the primary concern for the property as possible lead contamination in the basement and outdoors relating to gun range activities. GLESC recommended that soil borings be drilled outdoors and wipe samples be taken in the basement for analysis of lead. GLESC also recommended conducting an asbestos survey of the clubhouse to determine if the floor or ceiling tiles are asbestos-containing materials.

2.8.2 April 2005 – Limited Phase II Site Investigation

In April 2005, Great Lakes Environmental & Safety Consultants, Inc. performed limited Phase II environmental investigations at the site. Due to the nature of the shooting activities, the Phase II investigations focused on sampling for lead and semi-volatile organic compounds (SVOCs) in surface and subsurface soil, and in the basement of the clubhouse. A total of 19 soil samples were collected for analysis of lead and one sample was analyzed for STARS List SVOCs. The Phase II report determined that site soil has been impacted with lead associated with shotgun pellets. Also, surfaces in the basement were wipe tested and indicated elevated levels of lead in collected dust. The Phase II report indicated that the clay pigeon fragments are not considered a hazardous waste, but may need 'special waste approval' for disposal. Several SVOCs were detected in the samples collected from the debris area. Groundwater was not addressed during this investigation.

2.8.3 May 2006 – Supplemental Phase II Site Investigation Findings

In May 2006, Benchmark performed a supplemental soil investigation on behalf of Benderson focused on collecting site-wide near-surface (i.e., 0-6 inches below ground surface) soil samples to better delineate the areal extent of previously identified lead impact on-site. Forty-one soil samples were collected and analyzed for total lead concentrations and one sample was analyzed for toxicity characteristic leaching procedure (TCLP) for lead. The findings of that investigation indicated that the majority of the near-surface soils on-site have been impacted by lead. Lead concentrations in soil up to 98,000 milligrams per kilogram (mg/kg) or parts per million (ppm) were reported. The sample collected from the area of the active shooting range, which was also analyzed via TCLP, also exceeded the regulatory threshold for hazardous waste toxicity characteristics for lead of five milligrams per liter (mg/L). This finding established that some of the soils on-Site will either require to be treated to render them non-hazardous or be handled and disposed off-site at a permitted hazardous waste landfill.

2.9 Primary Constituents of Potential Concern (COPCs)

Based on findings to date, the only Constituents of Potential Concern (COPCs) are lead and polycyclic aromatic hydrocarbons (PAHs).

3.0 SCOPE OF WORK

The Remedial Investigation scope of work is focused on defining the nature and extent of contamination on-site, identifying the source of contamination, defining chemical constituent migration pathways, qualitatively assessing human health and ecological risks (if necessary), and obtaining data of sufficient quantity and quality to perform the remedial alternatives evaluation.

Field team personnel will collect environmental samples in accordance with the rationale and protocols described in the Field Sampling Plan (FSP) presented in the Quality Assurance Project Plan (QAPP), provided under separate cover. USEPA and NYSDEC-approved sample collection and handling techniques will be used. Samples for chemical analysis will be analyzed in accordance with NYSDEC ASP-CLP methodology to meet the definitive-level data requirements. Analytical results will be evaluated by a third-party data validation expert in accordance with provisions described in the QAPP.

3.1 Field Investigation Activities

3.1.1 Soil Investigation

To supplement the 2005-2006 preliminary site investigations performed by GLESC and Benchmark, additional surface and subsurface soil sampling will be performed to more fully delineate the nature and extent of contamination in Site soils. The soil investigation will include site-wide sampling for COPCs and limited sampling for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs) and metals. Based on previous investigations, lead and, to a lesser degree, PAHs, have been identified within on-site soils. The soil investigation will serve to delineate the vertical and areal extent of lead and PAHs on-site and to assess whether other potential contaminants exist within on-site soils at concentrations of concern.

Soil samples will be collected using dedicated stainless steel sampling tools. Due to soil sample volume requirements, especially when collecting quality assurance/quality control (QA/QC) samples, additional soil volume may be required. As such, a second or possibly third soil boring maybe required to provide the necessary sample volume. Additional soil borings will be advanced within a six-inch radius of the original soil boring and the soil samples will be homogenized in a dedicated bowl. Soil samples collected for VOC analysis

will be grab samples collected prior to homogenization. Representative soil samples will be placed in pre-cleaned laboratory provided sample bottles, cooled to 4ºC in the field, and transported under chain-of-custody command to Severn Trent Laboratories, Inc. (STL), located in Amherst, New York, a New York State Department of Health (NYSDOH) ELAP-certified analytical laboratory. Soil samples will be submitted for total lead (site-wide), TCLP lead (select locations) and PAHs (select locations). For site characterization purposes, additional soil samples will be analyzed for TCL VOCs, TCL SVOCs, TCL PCBs and TAL Metals in accordance with NYSDEC ASP CLP methodology. Please refer to Table 1 for a summary of the soil sampling and analysis plan. Please refer to Figure 3- Remedial Investigation Sample Locations for soil boring locations.

3.1.1.1 Total Lead Sampling

As previous preliminary site investigations have indicated that lead has impacted the near-surface soils, lead sampling will focus on collecting soil samples within 50-ft. by 50 ft. grids across the site and from zero to four-feet below ground surface (bgs). The top one foot bgs will be sampled in six-inch vertical intervals (i.e., 0-6 inches bgs and 6-12 inches bgs) and the remaining one ft. bgs to four ft. bgs samples will be collected in one-foot intervals (i.e., 1-2 ft. bgs, 2-3 ft. bgs and 3-4 ft. bgs). Upon sample collection, the 0-6 inches bgs and 6-12 inches bgs sample intervals will be analyzed for total lead and the remaining samples will be held at the laboratory for possible subsequent analysis. For samples that exceed 400 ppm total lead in the 6-12 inches bgs sample interval, the 1-2 ft. bgs sample interval will then be analyzed. The same protocol will be followed for the 2-3 ft. bgs and 3-4 ft. bgs sample intervals in sequence. With the exception of soil boring locations where monitoring wells are planned, soil samples will not be collected deeper than four ft. bgs during the planned investigation. If the data collected indicates significant contamination exists greater than four ft. bgs, additional samples will be planned for a subsequent field sampling event.

Based on the historic use of the site, there is the potential for lead shot to be present within soil samples, especially within surface soils in the area of the shooting range. Soil samples will be visually inspected for the presence of lead shot. If there is visible evidence of lead shot noted within a certain sample interval, that sample will not be analyzed and assumed to contain lead concentrations requiring remediation.

3.1.1.2 TCLP Lead Sampling

Previous investigations have identified total lead concentrations in surface soils up to 98,000 mg/kg and in subsurface soils up to 154,000 mg/kg. One sample analyzed for TCLP lead (SS-26) by Benchmark during the May 2006 Supplemental Lead Sampling Study also exceeded the TCLP hazardous waste characteristic threshold concentration of 5 mg/L. Therefore, to determine the extent of characteristic hazardous lead-containing soils on-site, select soil samples will be analyzed for TCLP lead. TCLP analysis will be completed for select samples based on the evaluation of total lead concentrations.

3.1.1.3 PAH Sampling

PAH sampling will be focused in the area of the shooting stations and in the area of the clay pigeons debris immediately north of the shooting stations (see Figure 3). PAH sampling will focus on collecting soil samples within 100 ft. by 100 ft. grids in the targeted area and from zero to four feet below ground surface (bgs). Similar to the lead sampling method, the top one foot bgs will be sampled in six-inch vertical intervals (i.e., 0-6 inches bgs and 6-12 inches bgs) and the remaining one ft. bgs to four ft. bgs samples will be collected in one-foot intervals (i.e., 1-2 ft. bgs, 2-3 ft. bgs and 3-4 ft. bgs). Upon sample collection, the 0-6 inches bgs and 6-12 inches bgs sample intervals will be analyzed and the remaining samples will be held at the laboratory for possible subsequent analysis based upon review of the initial upper 12 inches bgs data. For samples with elevated concentrations remaining in the 6-12 inches bgs sample interval, the 1-2 ft. bgs sample interval will then be analyzed. The same protocol will be followed for the 2-3 ft. bgs and 3-4 ft. bgs sample intervals in sequential order. With the exception of soil boring locations where monitoring wells are planned, soil samples will not be collected deeper than four ft. bgs.

3.1.1.4 Other Parameters Sampling

As a requirement of the NYSDEC BCP, surface and subsurface soil samples will be collected at select areas of the site and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, herbicides and/or metals to evaluate the potential presence of these contaminants. Five subsurface samples will be analyzed for Target Compound List (TCL) VOCs, TCL SVOCs, Target Analyte List (TAL) PCBs, TCL pesticides and herbicides, and TAL metals. Five surface samples will be analyzed for TCL SVOCs, TAL PCBs, TCL pesticides and

herbicides, and TAL metals. If target analytes are detected in soil samples above NYSDEC recommended cleanup objectives for restricted-residential use, additional samples will be planned for a subsequent field sampling event to delineate the extent of those contaminants.

3.1.2 Groundwater Investigation

Three monitoring wells, designated as MW-1, MW-2 and MW-3, will be installed at the approximate locations shown on Figure 3. The new monitoring wells will provide groundwater flow information as well as groundwater quality information. Monitoring well installation, well development, and groundwater sample collection are discussed in the sections below.

3.1.2.1 Monitoring Well Installation

Three borings will be advanced using hollow stem auger technology at the locations shown on Figure 3 to facilitate installation of four permanent groundwater monitoring wells, designated as MW-1 through MW-3. Based upon split spoon sample moisture descriptions and subsurface soil conditions, the installed monitoring wells will straddle the shallow groundwater table.

Each boring location will be advanced approximately 5 feet below the first encountered groundwater using hollow stem auger drilling methods. A 2-inch diameter, 2-foot long split spoon sampler will be advanced ahead of the auger string with a standard 140-pound hammer falling freely over a 30-inch fall until 24 inches have been penetrated or 50 blows applied. Recovered samples will be described in the field by qualified Benchmark personnel using the Unified Soil Classification System (USCS), scanned for total volatile organic vapors with a calibrated photoionization detector (PID) equipped with a 10.6 eV lamp (or equivalent), and characterized for impacts via visual and/or olfactory observations. All non-dedicated drilling tools and equipment will be decontaminated between boring locations using potable tap water and a phosphate-free detergent (e.g. Alconox).

Subsequent to boring completion, a 2-inch diameter flush-joint Schedule 40 PVC monitoring well will be installed at boring locations. Each well will be constructed with a 5-foot flush-joint Schedule 40 PVC, 0.010-inch machine slotted well screen. Each well screen and attached riser will be placed at the bottom of each borehole and a silica sand filter pack (size #0) will be installed from the base of the well to a maximum of 2 feet above the top of the screen. A minimum 2-foot thick bentonite chip seal will then be installed and allowed to

hydrate sufficiently to mitigate the potential for downhole grout contamination. If sufficient borehole annulus remains, cement/bentonite grout will be installed to approximately one-foot below ground surface via pressure tremie-pipe procedures. The newly installed monitoring wells will be completed with keyed alike locks, a lockable J-plug, and an 8-inch diameter steel flush mounted road box anchored within a 2-foot by 2-foot by 1-foot square concrete pad.

3.1.2.2 Well Development

Upon installation, but not within 24 hours, newly installed monitoring wells MW-1 through MW-3 will be developed in accordance with Benchmark and NYSDEC protocols. Development of the monitoring wells will be accomplished with dedicated disposable polyethylene bailers via surge and purge methodology. Field parameters including pH, temperature, turbidity and specific conductance will be measured periodically (i.e., every well volume or as necessary) during development. Field measurements will continue until they became relatively stable. Stability will be defined as variation between measurements of approximately 10 percent or less with no overall upward or downward trend in the measurements. A minimum of three well volumes will be evacuated from each monitoring well. Unless field observations suggest groundwater impact, development water from the monitoring wells will be discharged to the ground surface.

3.1.2.3 Groundwater Sample Collection

Prior to sample collection, static water levels will be measured and recorded from all on-site monitoring wells. Following water level measurement, Benchmark personnel will purge and sample the monitoring wells using either a peristaltic pump with dedicated pump tubing following low-flow/minimal drawdown purge and sample collection procedures or using a dedicated polyethylene bailer. Prior to sample collection, groundwater will be evacuated from each well at a low-flow rate (typically less than 0.1 L/min). Field measurements for pH, specific conductance, temperature, turbidity, and water level as well as visual and olfactory field observations will be periodically recorded and monitored for stabilization. Purging will be considered complete when pH, specific conductivity and temperature stabilize and when turbidity measurements fall below 50 Nephelometric Turbidity Units (NTU), or become stable above 50 NTU. Stability is defined as variation between field measurements of 10 percent or less and no overall upward or downward trend

in the measurements. Upon stabilization of field parameters, groundwater samples will be collected and analyzed as discussed below.

Upon arrival at each monitoring well, field personnel will visually inspect the monitoring well for defects and/or vandalism. Following location and inspection of each well, the static water level and total depth will be recorded and one standing well volume will be calculated. The following bulletized list describes each sample collection method that may be implemented during the RI.

- **Peristaltic Pump with Dedicated Pump Tubing**

  Wells less than 20 fbgs will be purged and sampled using a peristaltic pump and dedicated pump tubing following low-flow (minimal drawdown) purge and sample collection procedures in a manner similar to that described in the previous section. However, the pump will not require decontamination because all components are dedicated to each monitoring well.

- **Polyethylene Disposable Bailer**

  In the event of a pump malfunction, wells of any depth (up to 100 fbgs) may be purged and sampled using a polyethylene disposable bailer via direct grab. In general, a bottom filling dedicated polyethylene bailer is attached to a length of dedicated hollow-braid polypropylene rope and lowered into the well smoothly and slowly as not to agitate the groundwater or damage the well. Purging continues until a predetermined volume of water has been removed (typically three well volumes) or to dryness. Measurements for pH, temperature, specific conductance, dissolved oxygen (optional), Eh (optional), and turbidity are recorded following removal of each well volume. The well is purged until the readings for indicator parameters stabilize or the well is purged to dryness.

Prior to and immediately following collection of groundwater samples, field measurements for pH, specific conductance, temperature, turbidity, Eh, dissolved oxygen and water level as well as visual and olfactory field observations will be recorded. All collected groundwater samples will be placed in pre-cleaned, pre-preserved laboratory provided sample bottles, cooled to 4°C in the field, and transported under chain-of-custody command to STL for analysis.

If target analytes are detected in groundwater samples above NYSDEC groundwater quality standards (GWQS), additional rounds of groundwater sampling may be required.

3.1.2.4 Groundwater Sample Analyses

All groundwater samples will be analyzed for TCL VOCs, TCL SVOCs, PCBs, pesticides and TAL metals in accordance with NYSDEC ASP CLP methodology. All groundwater samples analyses will be reported with an ASP Category B deliverables package to allow for third party data usability assessment.

3.1.3 Field Specific Quality Assurance/Quality Control Sampling

In addition to the soil/fill and groundwater samples described above, field-specific quality assurance/quality control (QA/QC) samples will be collected and analyzed to ensure the reliability of the generated data as described in the QAPP (provided under separate cover) and to support the required third-party data usability assessment effort. Site-specific QA/QC samples will include matrix spikes, matrix spike duplicates, blind duplicates, and trip blanks as discussed below:

- **Blind Duplicate** - One blind duplicate will be collected and analyzed per 20 samples collected for the site-specific parameters per matrix (i.e., groundwater, soil). The location of the sample collection point will not be disclosed to the analytical laboratory, therefore the field sample containers will be returned to the laboratory identified only as the "blind duplicate". The well or sample location will be recorded in the Project Field Book and on the respective Water Sample Collection Log and the results will be compared to review analytical precision.

- **Matrix Spike/Matrix Spike Duplicate (MS/MSD)** – A sufficient volume of sample will be collected at one sampling location per 20 samples for MS/MSD analysis for the site-specific parameters per matrix (i.e., groundwater, soil). The laboratory will report the results of the MS/MSD analysis, which will be reviewed for sampling and analysis precision and accuracy.

Dedicated sampling equipment will be used to minimize field decontamination time and avoid the need for equipment blanks. QA/QC field sampling requirements are detailed further in the QAPP.

3.1.4 Bench-Scale Soil Treatability Testing

A previous investigation completed on-site by Benchmark reported an exceedance of the TCLP lead concentration threshold for hazardous waste toxicity characteristics of 5 mg/L. Based on total lead concentrations across the site, the potential exists that additional soil samples will exceed the TCLP lead threshold. Furthermore, it is likely that lead shot will

be present in some soil samples and that lead shot may be contributing to soil samples exceeding the TCLP lead threshold. As such, bench-scale soil treatability testing will be completed during the RI to evaluate potential physical separation methods and/or soil amendments that would result in a reduction of the TCLP lead concentration below 5 mg/L and consequently result in the soil being considered a non-hazardous waste. Up to three soil amendments will be evaluated in up to three concentrations as described below.

Benchmark has previously completed treatability testing for evaluation of lead stabilization treatment methods. That testing included evaluation of phosphoric acid and Portland cement as soil amendments to reduce TCLP lead concentrations. The results of that testing, which were published in a paper titled "Large-scale Permanganate Oxidation and Chemical Metal Fixation in Soils at Inactive Coke Manufacturing Plant- Case Study" (Ref. 9), indicated that soil amendments, including 2% by weight addition of phosphoric acid, 5% by weight addition of phosphoric acid and 10% by weight addition of Portland cement, were effective lead stabilization treatment methods.

Following similar methods to testing previously completed by Benchmark, the following approach will be implemented.

- TCLP lead sample data collected during the RI will be reviewed to determine which areas of the site contain characteristic hazardous soil for lead. Two sample areas that exceeded the TCLP lead threshold will be selected for evaluation.
- Four five-gallon buckets of soil sample will be collected from each area using a hand-held shovel and transported under standard chain of custody to STL Laboratories. The bench-scale treatabilty tests will be completed at STL laboratories by Benchmark personnel.
- One homogenized sample will be placed and weighed in a disposable plastic container.
- Soil amendments will be weighed into aliquots, based on the weight of the soil sample and mixed into the soil. Deionized water may be used to enhance dispersion in the soil samples.
- Another homogenized soil sample will be passed through a sieve of small enough size to remove lead shot typically used in target and skeet shooting

(i.e., 2.03 mm to 2.41 mm in diameter). Soil amendments will be added to the sieved sample in the same manner as the non-sieved sample.

- The treated soils will then be re-tested for TCLP lead.

3.2 Investigation-Derived Waste Management

During installation of the monitoring wells, excess soil cuttings will be containerized in 55-gallon drums. Groundwater from well development and purging will be discharged to the ground surface. However, if field observations suggest groundwater impact, the water will be containerized in 55-gallon drums. Drums will be labeled with regard to contents, origin, and date of generation using a paint stick marker on two sides and the top of each drum. The drums will be staged on-site pending soil and groundwater analyses and remedial measures assessment.

3.3 Site Mapping

A site map will be developed during the field investigation. All sample points and relevant site features, including buildings, will be located on the site map. Benchmark will employ a Trimble GeoXT handheld GPS unit to identify the locations of all soil borings and newly installed wells relative to New York State planar grid coordinates. Monitoring well elevations will be measured by Benchmark's surveyor. An isopotential map showing the general direction of groundwater flow will be prepared based on water level measurements relative to USGS vertical datum. The maps will be provided with the RI report.

4.0 QUALITY ASSURANCE/QUALITY CONTROL PROTOCOLS

A Quality Assurance Project Plan (QAPP) has been prepared as a stand-alone document for the RI activities. The QAPP dictates implementation of the investigation tasks delineated in this Work Plan. A Sampling and Analysis Plan (SAP) identifying methods for sample collection, decontamination, handling, and shipping, is provided as Section 4.0 to the QAPP. The RI project management methods, organizational structure, and schedule are also included in the QAPP.

The QAPP will assure the accuracy and precision of data collection during the site characterization and data interpretation periods. The QAPP identifies procedures for sample collection to mitigate the potential for cross-contamination, as well as analytical requirements necessary to assure compliance with NYSDEC (ASP) Contract Laboratory Procedures (CLP) methodology. The QAPP has been prepared in accordance with USEPA's Requirements for Quality Assurance Project Plans for Environmental Data Operations (EPA QA/R-5); the EPA Region II CERCLA Quality Assurance Manual, and NYSDEC's December 2002 draft DER-10 Technical Guidance for Site Investigation and Remediation.

5.0 HEALTH AND SAFETY PROTOCOLS

Benchmark and our construction and operations arm, TurnKey Environmental Restoration, have prepared a Site-Specific Health and Safety Plan (HASP) for use by our employees in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120. The HASP, provided in Appendix B, includes the following site-specific information:

- A hazard assessment.
- Training requirements.
- Definition of exclusion, contaminant reduction, and other work zones.
- Monitoring procedures for site operations.
- Safety procedures.
- Personal protective clothing and equipment requirements for various field operations.
- Disposal and decontamination procedures.

The HASP also includes a contingency plan that addresses potential site-specific emergencies, and a Community Air Monitoring Plan that describes required particulate and vapor monitoring to protect the neighboring community during intrusive site investigation activities. The HASP and Community Air Monitoring Plan will be modified/expanded as appropriate if significant site invasive activities are deemed necessary, such as those associated with soil excavation.

Health and safety activities will be monitored throughout the field investigation. A member of the field team will be designated to serve as the on-site Health and Safety Officer throughout the field program. This person will report directly to the Project Manager and the Corporate Health and Safety Coordinator. The HASP will be subject to revision as necessary, based on new information that is discovered during the field investigation.

6.0 CITIZEN PARTICIPATION ACTIVITIES

NYSDEC will coordinate and lead community relations throughout the course of the project. Benchmark will support NYSDEC's community relations activities, as necessary. A Citizen Participation Plan will be prepared by Benchmark and submitted to NYSDEC under separate cover. The Citizen Participation Plan will follow NYSDEC's Citizen Participation Plans template for Brownfield Cleanup Program sites entering the BCP at the point of site investigation.

7.0 REPORTING AND SCHEDULE

7.1 RI Report

A Remedial Investigation report will be prepared at the conclusion of the investigation. The RI report will include the following information and documentation, consistent with the NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation.

- Introduction and background.
- A description of the site and the investigation areas.
- A description of the field procedures and methods used during the RI.
- A discussion of the nature and rationale for any significant variances from the scope of work described in this RI Work Plan.
- The data obtained during the RI and historical data considered by Benchmark to be of useable quality. This will include geochemical data, field measurements, etc.
- The results of an assessment of the achievement of RI acceptance/performance criteria as specified in the QAPP.
- Comparative criteria that may be used to calculate cleanup levels during the RAR process, such as NYSDEC Soil Cleanup Objectives and other pertinent regulatory standards or criteria.
- A discussion of contaminant fate and transport. This will provide a description of the hydrologic parameters of the Site, and an evaluation of the lateral and vertical movement of groundwater.
- Conclusions regarding the extent and character of environmental impact in the media being investigated.
- The conclusions of the qualitative human health and environmental risk assessments, including any recommendations for more detailed assessments, if applicable.

- Supporting materials for RI data. These will include boring logs, monitoring well construction diagrams, laboratory analytical reports, aquifer test calculation sheets, and similar information.

In addition, Benchmark will require third party data review by a qualified, independent data validation expert. Specifically, a Data Usability Summary Report (DUSR) will be prepared, with appropriate data qualifiers added to the results. The DUSR will follow NYSDEC format per the Department's September 1997 DUSR guidelines and draft DER-10 guidance. The DUSR and any necessary qualifications to the data will be appended to the RI report.

7.2 Alternatives Analysis Report

An alternatives analysis report (AAR) will be developed to provide a forum for evaluating and selecting a recommended remedial approach. A list of remedial action objectives will be developed based on findings of the RI and the requirement for the selected remedial measures to be protective of human health and the environment under the proposed future use scenario. Proposed site-specific action levels (SSALs) for the property will also be presented. SSALs will be based on published standards, criteria and guidance (SCGs) and other NYSDEC and NYSDOH-accepted values.

Based on the remedial action objectives and SSALs, volumes and areas of media potentially requiring remediation will be calculated. General response actions will then be delineated to address each of the site problem areas. These response actions will form the foundation for the development and screening of applicable remedial alternatives against the following criteria as described in 6NYCRR 375-1.10:

- Protection of Human Health and the Environment.
- Compliance with Standards, Criteria, & Guidance (SCGs).
- Short-term Effectiveness & Impacts.
- Long-term Effectiveness & Permanence.
- Reduction of Toxicity, Mobility, or Volume.
- Implementability

- Cost

In addition, the criteria of Community Acceptance will be considered based on public comments on the AAR and proposed remedial action. Following the screening of alternatives, a comparative analysis will be performed against the above criteria. The comparative analysis will allow for better understanding of the relative advantages and disadvantages of each of the alternatives, and will facilitate identification of a recommended remedial approach.

7.3 Project Schedule

A tentative project schedule for the major tasks to be performed in support of the RI/AAR is presented as Figure 4.